89- 1417

Supreme Court, U.S.
FILED
MAR 8 1990
JOSEPH F. SPANIOL, JR.
CLERK

No. _____

In The

Supreme Court of the United States

October Term, 1989

HARRY I. ZELTZER,

Petitioner,

vs.

JEFFREY M. SAMUELS, ACTING COMMISSIONER OF PATENTS AND TRADEMARKS,

Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

JOSEPH ZALLEN
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25 pp

STATEMENT OF QUESTIONS PRESENTED FOR REVIEW

1) Whether in refusing a patent because of "obviousness", the Patent and Trademark Office must give full consideration to all the requirements of this Court as stated in *Graham v. John Deere Co.*, 383 U.S. 1 (1966).

2) Whether the failure of the Patent and Trademark Office to give full consideration to all the requirements of *Graham v. John Deere Co.* in refusing a patent for "obviousness" constitutes a violation of the constitutional provision that the patent laws are intended to promote the progress of science and the useful arts.

3. Whether the failure of the Patent and Trademark Office to "resolve the level of ordinary skill in the pertinent art" when refusing a patent for "obviousness" constitutes a lack of due process.

PARTIES TO THE PROCEEDING

The Petitioner and Respondent named in the caption of this case are the only parties to the proceeding.-

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CONSTITUTION:

Article 1, Section 8, U.S. Constitution 1

Fifth Amendment, U.S. Constitution 1

STATEMENT OF GROUNDS FOR JURISDICTION

The judgment sought to be reviewed was entered on December 11, 1989 by the United States Court of Appeals for the Federal Circuit (App. 1,2). The United States Court of Appeals for the Federal Circuit has exclusive jurisdiction under 28 U.S.C. § 1295(a)(4)(A) of an appeal from a decision of the Board of Patent Appeals and Interferences of The Patent and Trademark Office with respect to patent applications. Jurisdiction is conferred on this Court by 28 U.S.C. § 1254 which provides that cases in the courts of appeals may be reviewed in this Court by writ of certiorari granted upon the petition of any party.

CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED IN THIS CASE

The Constitutional provisions involved in this case are that portion of Article 1, Section 8, which states that:

> "The Congress shall have Power . . . To promote the Progress of Science and useful Arts by securing for a limited Time to Authors and Inventors the exclusive Right to their respective Writings and Discoveries; . . . ."

and that portion of the Fifth Amendment to the Constitution which reads:

> "No person shall . . . [nor] be deprived of life, liberty or property, without due process of law; . . . "

The pertinent statute is 35 U.S.C. § 103, which states:

> "§ 103. Conditions for patentability; non-obvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. (Added November 8, 1984, Public Law 98-622, sec. 103, 98 Stat. 3384.)"

STATEMENT OF THE CASE

Over 4% of the world's population are born color-blind; in the United States alone there are over 10 million color-blind persons. In 1969 the petitioner, a doctor of optometry, made the revolutionary discovery that he could drastically improve color discrimination in a color-blind person by the method of inserting, into *one* eye only, a *wholly-red, hard* contact lens. He received United States Patents Nos. 3,586,423 (App. 22-24) and 3,701,590 (App. 21) for this method.

Dr. Zeltzer's present patent application (App. 14-20) is primarily concerned with a *soft* contact lens which

instead of being wholly red, is clear except for a red central area aligned with the pupil of the eye. The Patent Examiner rejected the application (App. 8-13), which rejection was upheld by the Board of Patent Appeals and Interferences (App. 3-6) and affirmed with no discussion by the Court of Appeals for the Federal Circuit (App. 2), whose jurisdiction is derived from 28 U.S.C. § 1295(a)(4)(A). The basis for the rejection was the Examiner's contention that the invention was obvious "to an ordinary person skilled in the art" under 35 U.S.C. § 103, because of Zeltzer patent No. 3,701,590 (App. 21) which relates to color blindness and Neefe patent No. 3,034,403 (App. 25-27) which relates to a sunglass lens.

ARGUMENT

In 1952 Congress codified the century-old judicial standard that had been in effect since *Hotchkiss v. Greenwood*, 152 U.S. (11 How.) 248, 267 (1851), by requiring that an improvement sought to be patented should not be:

> " . . . obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. . . ." (35 U.S.C. § 103)

Fourteen years later *Graham v. John Deere Co.*, 383 U.S. 1 (1966) stated in detail the requirements for a determination of obviousness in accordance with § 103 as follows:

> "Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in

> the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy. See Note, Subtests of "Nonobviousness," 112 U. Pa. L. Rev. 1169 (1964)."

In all its subsequent relevant decisions this Court has consistently reaffirmed the requirements of *Graham v. John Deere Co.*, as being the law. See *Bonito Boats, Inc. v. Thundercraft Boats, Inc.*, ___ U.S. ___, 109 S.Ct. 971 (1989); *Dennison Manufacturing Co. v. Panduit Corp.*, 475 U.S. 809 (1986); *Roanwell Corp. v. Plantronics*, 429 U.S. 1004 (1976); *Sakraida v. AG Pro, Inc.*, 425 U.S. 273 (1976); *Anderson's Black Rock, Inc. v. Pavement Salvage Co., Inc.*, 396 U.S. 57 (1969).

Since the landmark decision of *Graham, supra,* was enunciated twenty-four years ago, there have been several thousand federal court decisions, an unknown but much larger number of Patent Office appellate decisions, and countless patent applications prosecuted within the Patent and Trademark Office which have dealt with the application of the obviousness doctrine.[1]

In this present case, neither the Patent Examiner, nor the Board of Patent Appeals and Interferences, nor the

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[1] A Shepard citation check through the Lexis electronic database indicates that there have been over 500 federal appellate decisions relying on *Graham v. John Deere Co.* for guidance.

Court of Appeals for the Federal Circuit has heeded the admonition of *Graham v. John Deere Co.* that all of its tests be applied. In particular, they failed to "resolve the level of ordinary skill in the pertinent art".

There is an urgent present-day need in our country to encourage innovation and advances in science and the useful arts. However, a medical device, such as the present invention, requires extensive testing to obtain the required F.D.A. (Food and Drug Administration) approval before it can be marketed. Without a patent, it is very difficult to obtain the substantial financing needed for F.D.A. approval and subsequent marketing. Thus, an independent inventor such as the petitioner requires a patent in order for the public to ever receive the benefits of his invention.

The failure of the Patent and Trademark Office to carry out the *full* mandate of *Graham v. John Deere Co.* violates the Constitutional requirement to promote the useful arts and is a denial of due process.

CONCLUSION

The petitioner respectfully requests that Certiorari be granted to permit the Supreme Court to review a serious problem in patent examining procedure.

Respectfully submitted,

/s/ JOSEPH ZALLEN

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UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

89-1518

IN RE HARRY I. ZELTZER

JUDGMENT

ON APPEAL from the United States Patent and Trademark Office, Board of Patent Appeals and Interferences

in CASE NO(S). Appeal No. 86-3284

This CAUSE having been heard and considered, it is

ORDERED and ADJUDGED:

AFFIRMED.

ENTERED BY ORDER OF THE COURT

DATED
DEC 11 1989

/s/ Francis X. Gindhart
Francis X. Gindhart, Clerk

ISSUED AS A MANDATE: JAN - 2 1990

Note: This Opinion has not been prepared for publication in a printed volume because it does not add significantly to the body of law and is not of widespread legal interest. It is a public record. It is not citable as precedent. The decision will appear in tables published periodically.

UNITED STATES COURT OF APPEALS OF THE FEDERAL CIRCUIT

89-1518

IN RE HARRY I. ZELTZER

DECIDED December 11, 1989

Before NIES, *Circuit Judge*, BALDWIN, *Senior Circuit Judge*, and NEWMAN, *Circuit Judge*.

BALDWIN, *Senior Circuit Judge*.

DECISION

The decision of the United States Patent and Trademark Office (PTO), Board of Patent Appeals and Interferences (Board), Appeal No. 86-3284, (April 14, 1989), affirming the PTO's final rejection of claims 1 - 5 in U.S. patent application serial no. 731,763, under 35 U.S.C. § 103 (1982 and Supp. V 1987), is *affirmed* on the basis of the Board's opinion.

Art Unit 257 MAILED Paper No. 16

Appeal No. 86-3284 APR 14 1989 dm

On Brief PAT & TM OFFICE BOARD OF PATENT APPEALS AND INTERFERENCES

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte Harry I. Zeltzer

* * *

Application for Patent filed May 8, 1985, Serial No. 731,763, which is a Continuation of Serial No. 559,969, filed December 9, 1983. Contact Lens For Correction Of Color Blindness.

Joseph Zallen, et al. for appellant.

Primary Examiner – John K. Corbin
Examiner – Scott Sugarman.

Before Forrer, Lindquist and Rubinson, Examiners-in-Chief.

Lindquist, Examiner-in-Chief.

This appeal is from the final rejection of claims 1 through 5, all the claims in this case.

The invention pertains to a contact lens having a central portion of red coloration of a diameter such as to cover light entering the pupil.

Claim 5 is illustrative of the invention and is reproduced as follows:

5. A corneal contact lens which improves the color discrimination of a color blind person, said lens comprising a clear, corneal contact lens having a central red zone, light passing through said red zone having substantially all its transmission above about 6000°A [sic]; said red zone being of a diameter such as to cover light entering the pupil, the remainder of the lens being clear.

The references cited by the examiner are as follows:

Neefe	3,034,403	May 15, 1962
Zeltzer	3,701,590	Oct. 31, 1972

All the claims at bar stand rejected under 35 U.S.C. 103 as obvious. As evidence of obviousness, the examiner cites Zeltzer and Neefe.

Reference is made to the brief and the answer for the respective positions of the appellant and the examiner.

OPINION

We have considered the entire record of this application and conclude that the subject matter as a whole of the claims at bar would have been obvious to the artisan within the meaning of 35 U.S.C. 103 in view of the evidence before us.

A threshold question raised by the appellant is that Neefe is not concerned with improving color vision and, therefore, is not relevant prior art. While we are convinced that the appellant's field of endeavor is broader than he asserts and includes tinted or colored contact lenses – fully colored (Zeltzer) or partially tinted (Neefe) – Neefe is manifestly analogous art in that the reference concerns filtering light entering the pupil – the appellant's solution for improving color vision. Cf. *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); *In re Wood*, 599 F.2d 1032, 202 USPQ 171 (CCPA 1979); *In re Antle*, 444 F.2d 1168, 170 USPQ 285 (CCPA 1971).

The appellant's argument at page 9 of the brief that the artisan would not "select" the patent to Neefe "to come up with the present invention, except by hindsight" is not persuasive. First, the reference is not relied on by itself to satisfy the requirements of the claims at bar. Rather, the examiner relies on the collective teachings of Neefe and Zeltzer as evidence of obviousness. And second, the issue of obviousness is determined entirely with reference to a hypothetical person having ordinary skill in the art who is presumed to be aware of all the pertinent prior art. *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 227 USPQ 293 (Fed. Cir. 1985).

The appellant maintains that the motive or suggestion for combining the prior art disclosures have not been established. We disagree. Zeltzer teaches that a red tinted contact lens to filter light entering the pupil is effective in improving color discrimination, and Neefe teaches that the size of the tinted surface layer of a contact lens need only correspond to the expected size of the pupil to be effective in filtering light entering the pupil. Accordingly,

the artisan would have been motivated to limit the red coloration of the Zeltzer lens to a central area approximating the size of the pupil as taught by Neefe because of the manufacturing simplicity of providing a colored layer on just a small portion of a contact lens surface and because the small pupil size coloration would not be as noticeable to others. Alternatively, the artisan would have been induced to color the tinted layer of the Neefe lens red as taught by Zeltzer to improve color vision.

Accordingly, the rejection of claims 1 through 5 under 35 U.S.C. 103 is affirmed.

The appellant is advised that 37 CFR 1.136(a) does not apply to the times for taking any subsequent action in connection with this appeal.

AFFIRMED

/s/ Donald D. Forrer
Donald D. Forrer
Examiner-in-Chief

/s/ William F. Lindquist
William F. Lindquist
Examiner-in-Chief

/s/ Gene Z. Rubinson
Gene Z. Rubinson
Examiner-in-Chief

BOARD OF PATENT APPEALS AND INTERFERENCES

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731763

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_____ 1. *Application* ✔ *papers.*

_____ 6. Rejection (3 months) July 1, 1985 6/24

_____ 7. Response Oct. 7, 1985 illegible

_____ 8. FR (3 months) Jan 14, 1986 J.S.

_____ 9. Notice of Appeal 86-3284 April 9, 1986

_____ 10. Appeal Brief June 9, 1986

_____ 11. Examiner's answer Sept. 17, 1986 W.K.H.

10-21-86 12. Req. Oral Hrg. Oct. 6, 1986

_____ 13. March 30, 1989 illegible

_____ 14. Hrg. Conf. Jan 3, 1989

_____ 15. Hrg. Waived March 27, 1989

_____ 16. Decision by Board Apr. 14, 1989 Affirmed

_____ 17. Appeal to Fed Cir. June 7, 1989 (Copy Exp. Mail 6-6-89)

[Nos. 18 through 36 blank lines omitted]

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UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE
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FIRST NAMED APPLICANT
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ATTORNEY DOCKET NO.
H Z-1513

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EXAMINER
SUGARMAN, S.

ART UNIT	PAPER NUMBER
257	8

DATE MAILED: 01/14/86

This is a communication from the examiner in charge of your application.

COMMISSIONER OF PATENTS AND TRADEMARKS

___ This application has been examined ✔ Responsive to communication filed on Oct. 7, 1985 ✔ This action is made final.

A shortened statutory period for response to this action is set to expire three month(s) from the date of this letter.

Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ___ Notice of References Cited by Examiner, PTO-892.
2. ___ Notice re Patent Drawing, PTO-948.
3. ___ Notice of Art Cited by Applicant, PTO-1449
4. ___ Notice of informal Patent Application, Form PTO-152
5. ___ Information on How to Effect Drawing Changes, PTO-1474
6. ___ _____

Part II SUMMARY OF ACTION

1. ✔ Claims 1-5 are pending in the application.

   Of the above, claims _____ are withdrawn from consideration.

2. ___ Claims _____ have been cancelled.
3. ___ Claims _____ are allowed.
4. ✔ Claims 1-5 are rejected.
5. ___ Claims _____ are objected to.
6. ___ Claims _____ are subject to restriction or election requirement.
7. ___ This application has been filed with informal drawings which are acceptable for examination purposes until such time as allowable subject matter is indicated.
8. ___ Allowable subject matter having been indicated, formal drawings are required in response to this Office action.
9. ___ The corrected or substitute drawings have been received on _____ . These drawings are ___ acceptable; ___ not acceptable (see explanation).

10. ___ The ___ proposed drawing correction and/or the ___ proposed additional or substitute sheet(s) of drawings, filed on _____, has (have) been ___ approved by the examiner. ___ disapproved by the examiner (see explanation).

11. ___ The proposed drawing correction, filed _____, has been ___ approved, ___ disapproved (see explanation). However, the Patent and Trademark Office no longer makes drawing changes. It is now applicant's responsibility to ensure that the drawings are corrected. Corrections MUST be effected in accordance with the instructions set forth on the attached letter "INFORMATION ON HOW TO EFFECT DRAWING CHANGES", PTO-1474.

12. ___ Acknowledgment is made of the claim for priority under 35 U.S.C. 119. The certified copy has ___ been received ___ not been received

___ been filed in parent application, serial no. ___; filed on _____.

13. ___ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. ___ Other

EXAMINER'S ACTION

PTOL-326 (Rev. 7 - 82)

Serial No. 731, 763
Art Unit 257

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> Subject matter developed by another person, which qualifies as prior art only under subsection (f) and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 1-5 are rejected under 35 U.S.C. 103 as being unpatentable over Zeltzer ('590) in view of Neefe.

Zeltzer teaches a contact lens which improves the discrimination of a color blind person and having red coloration which has substantially all of its transmission above about 6000A. Transmission could be at least 60% (col. 1, lines 38-40). It would be obvious to tint only the central portion of the exterior surface of the lens such that it only covers the pupil, since, as shown by Neefe (Figs. 3 and 4), the tinting could be located in such a manner. Utilizing this structure in a soft lens or a gas permeable lens is an obvious matter of routine design choice by the ordinary skilled contact lens designer.

Applicant's arguments filed October 7, 1985 have been fully considered but they are not deemed to be persuasive. Applicant argues that the disclosure of

Zeltzer is limited to a lens which is colored throughout its body and also argues that Neefe does not disclose an exterior tinted surface but rather a controlled plug in a preformed hole. The Examiner points out that Zeltzer is applied for its teaching of known bandpass characteristics in a contact lens for functioning to improve color discrimination. Furthermore, Neefe teaches (col. 2, lines 33-35) that the dye can be put on the front surface.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). The practice of automatically extending the shortened statutory period an additional month upon the filing of a timely first response to a final rejection has been discontinued by the Office. See 1021 TMOG 35.

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE **THREE MONTHS** FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 CFR 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

Any inquiry concerning this communication should be directed to Scott J. Sugarman at telephone number 703-557-2910.

JOHN K. CORBIN
SUPERVISORY PATENT EXAMINER
GROUP ART UNIT 257

Sugarman/gd
12-20-85

File Z-1513

United States Patent Application

of

Harry I. Zeltzer

for

CONTACT LENS FOR CORRECTION OF COLOR BLINDNESS

Abstract of Disclosure

A corneal contact lens for the correction of color blindness, which is clear except for a thin red exterior layer covering the area admitting light to the pupil.

Background of Invention

This invention relates to the use of corneal contact lenses for the correction of color blindness, in particular, soft or gas-permeable lenses.

U.S. Patents 3,586,423 and 3,701,590 describe red-colored contact lenses which can be used to correct color blindness. In particular lenses illustrated in these patents and those made commercially under those patents are colored throughout with a red coloration. Whereas such coloration throughout the lens is satisfactory for so-called hard lenses made from plastic, it has been difficult to fashion a soft lens or a gas-permeable lens wherein the color remains uniformly distributed throughout the lens.

One object of the present invention is to provide a soft or gas-permeable contact lens containing red coloration which can be used for the correction of color blindness and which is relatively simple to manufacture.

Other objects and advantages of this invention will be apparent from the description and claims which follow taken together with the appended drawings.

Summary of Invention

This invention comprises generally a central red zone in an otherwise clear contact lens. In its preferred form a thin layer of red coloration is placed on the center of the external surface of a clear corneal contact lens. This invention is applicable to hard, soft and gas-permeable contact lenses. The central red coloration is in line with the axis of the pupil and is preferable of a diameter such as to cover light entering the pupil, the remainder of the lens being clear. The coloration may be applied by painting, silk screening, stamping, or imprinting. Light having a wave length of below about 6000 A° is substantially all absorbed. The red zone of the lens has transmissions of at least 60% of light of a wave length above about 6000 A°.

A lens made in accordance with this invention typically has a lens thickness in the order of 0.15 mm. The size of the lens depends somewhat on the size of the eye to be fitted and is in the range of 11-15 mm, the average diameter of the cornea of an eye being 12 mm. However, many individuals have diameters which are larger or smaller and eyelid openings which are larger or smaller. Similarly the average radius of a cornea is between 42 and 44 diopters but many corneas are steeper and flatter. Proper positioning of the lens of the present invention on a cornea is dependent on these factors as well as weight.

Brief Description of Drawings

Fig. 1 is a diagrammatic section of an eye with a lens of this invention in position on the cornea of the eye.

Fig. 2 is a side view of the lens alone.

Fig. 3 is a front view of the lens alone.

The lens 15 is seated on the cornea 11 of the eye 10 so that the external central red-colored area 16 covers the light entering the eye through the cornea 11, anterior chamber 12, pupil of the iris 14, and eye lens 13.

Specific Examples of Invention

Example 1.

A clear soft corneal contact lens having a diameter of 14.5 mm was coated on its spherical external center with a thin layer of red dye solution on an area having a diameter of 6mm. The colored area which is at the corneal apex is in the axis of the pupil of the eye. The application of the thin red layer was limited to the center area and the rest of the lens was left clear. The particular dye used was Passaic Color and Chemical Co. "Oil red 2144" which is insoluble in water but soluble in aromatic hydrocarbon. Transmission of light through the red spot was substantially all above 6000 A° with very little transmission below.

Example 2.

A clear gas-permeable contact lens having a diameter of 14.5 mm was coated on its exterior center in the

manner specified in Example 1. Transmission of light through the red spot was similar to that in Example 1.

Upon clinical tests, I found that a thin red layer of this sort which covered the pupil was sufficient to provide a similar increase in color discrimination as when the entire lens was red colored.

The soft and gas-permeable lenses of this invention are not only more comfortable to wear, but can be worn for much longer periods of time than a hard lens. In addition, since the colored area is much smaller there is a marked reduction in the color an observer notes in the eye. Further, the lens can be made sufficiently large to enable ready and stable centration, without jeopardizing oxygen-transmission.

Claims

1. A corneal contact lens which improves the color discrimination of a color blind person, said lens comprising a clear, corneal contact lens having on the central portion of its exterior surface a thin layer of red coloration, light passing through the red layer having substantially all its transmissions above about 6000 A°; said red layer covering substantially all the light admitted to the pupil of the eye.

2. The lens of Claim 1 wherein the lens is a soft lens.

3. The lens of Claim 1 wherein the lens is a gas-permeable lens.

4. The lens of Claim 1 wherein the transmission is at least 60%.

5. A corneal contact lens which improves the color discrimination of a color blind person, said lens comprising a clear, corneal contact lens having a central red zone, light passing through said red zone having substantially all its transmission above 6000 A°.

THE CLAIMS

The claims on appeal read as follows:

1. A corneal contact lens which improves the color discrimination of a color blind person, said lens comprising a clear, corneal contact lens having on the central portion of its exterior surface a thin layer of red coloration, light passing through the red layer having substantially all its transmission above about 6000 Angstroms; said red layer being of a diameter such as to cover light entering the pupil, the remainder of the lens being clear.

2. The lens of Claim 1 wherein the lens is a soft lens.

3. The lens of Claim 1 wherein the lens is a gas-permeable lens.

4. The lens of Claim 1 wherein the transmission is at least 60%.

5. A corneal contact lens which improves the color discrimination of a color blind person, said lens comprising a clear, corneal contact lens having a central red zone, light passing through said red zone having substantially all its transmission above about 6000 Angstroms; said red zone being of a diameter such as to cover light entering the pupil, the remainder of the lens being clear.

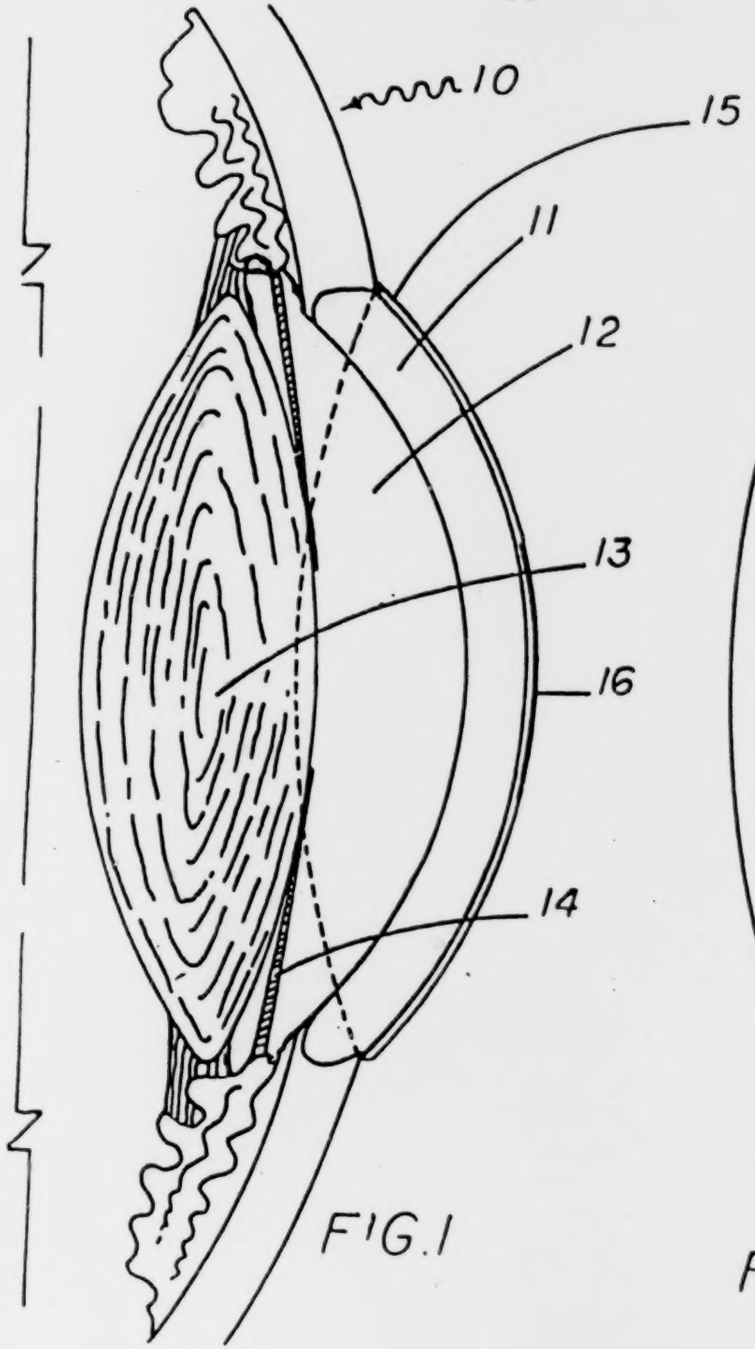

FIG. 1

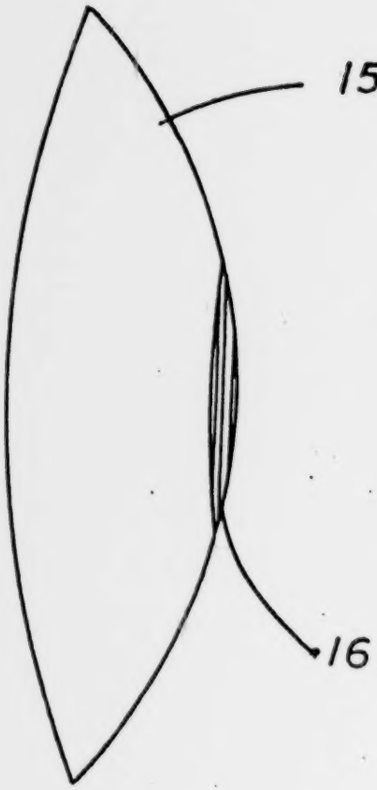

FIG. 2

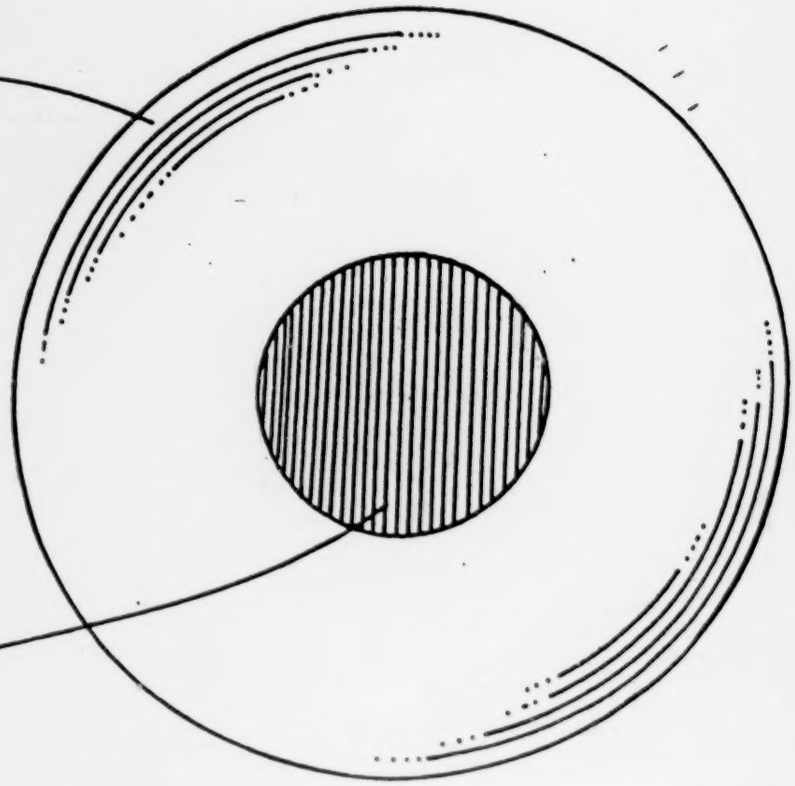

FIG. 3

United States Patent Office 3,701,590
Patented Oct. 31, 1972

3,701,590

METHOD OF IMPROVING COLOR DISCRIMINATION

Harry I. Zeltzer, Manchester by the Sea, Mass., assignor of a fractional part interest to Joseph Zallen, Boston, Mass.

No Drawing. Filed Nov. 8, 1971, Ser. No. 196,584
The portion of the term of the patent subsequent to June 22, 1988, has been disclaimed
Int. Cl. G02c 7/10, 7/04; G02b 1/04
U.S. Cl. 351—39 1 Claim

ABSTRACT OF THE DISCLOSURE

Color discrimination is improved in color blind persons by applying to one eye only a thin corneal contact lens transmitting light substantially only in the red zone and having light transmission in excess of approximately 40%.

This invention relates to a method and device for improving color discrimination. In particular it relates to the improvement in color discrimination in persons commonly referred to as "color blind."

In my U.S. Pat. No. 3,586,423, I described a method and device for improving color discrimination in which a corneal contact lens is applied to one eye only, the other eye being either naked or with the required refractive correction. The corneal contact lens of this patent was described as being thin, transmitting light substantially only in the red zone, having approximately 14 to 40% light transmission and having substantially no transmission below 590 millimicrons. In the clinical experiments that I conducted leading to the patent, I found that below about 14% light transmission binocular vision began to be affected. I also found that when transmission was higher than about 40% the color discrimination ability apparently began to decrease.

I have treated a number of color blind patients in accordance with my patent and found that nearly all reported substantial improvement in color discrimination. However, there was one myopic, color blind patient who reported that when he wore the single contact lens in accordance with the patent, the lens seemed too dark.

Accordingly, I decided to re-investigate the upper limit of approximately 40% transmission that my earlier experiments appeared to establish. Unexpectedly, I found that with single red contact lenses having transmissions of up to about 85%, color blind patients reported substantial improvement in color discrimination and the myopic patient could now use the lens under low light.

It now appears from further experiments that the approximate 40% transmission maximum was anomalous. I have now determined that applying to one eye only a thin corneal contact lens transmitting light substantially only in the red zone, having an amount of light transmission in excess of approximately 40%, and having substantially no transmission below approximately 590 millimicrons improves color discrimination in a person deficient in color discrimination. As in my patent, the other eye is left uncovered except for the optional use of a spectacle lens, conventional corneal contact lens, or a combination thereof to provide a desired refractive correction for that eye.

The corneal contact lens of this invention can be made from a variety of materials including polymethacrylate resins. In general, acuity should be at least 20/40 so that stereopsis is not lost. This invention should not be expected to improve color perception in persons who have

amblyopia, strabismus or monocular vision. The lens of this invention appears to have the same usefulness as the lens in the prior patent in that it does not interfere with the person's mobility or performance of ordinary functions such as walking, driving, writing, reading or working. It appears to have some superiority in performing these functions under artificial light and marked superiority with respect to pastel colors as compared with the lens used in my patent.

SPECIFIC EXAMPLE OF INVENTION

In one example of this invention, a contact lens was used which was made of red polymethacrylate. The lens had a radius of 7.76 mm., a diameter of 9.3 mm. and a thickness of .11+ mm. It had peripheral bevels of 13.00 mm./.2 mm., 9.50 mm./.2 mm. and 8.50 mm./.2 mm., and an optic zone of 8.1 mm. The lens transmitted substantially only in the red zone with practically no transmission below about 590 millimicrons, and had light absorption of about 15–20%, or light transmission of about 80 to 85%.

I fitted the myopic patient with this single contact lens in one eye, namely his non-dominant eye, leaving the dominant eye covered with a clear spectacle lens having the required correction for his myopia. The patient's response was immediately very favorable. Whereas he had been unable to use the lens of my patent, he now found that he could wear the lens of the present invention with comfort. Further, he reported a very substantial increase not only in color discrimination but also in his general ability to discriminate visually and see objects more clearly. Further, the patient reported that he could distinguish between pastel colors and that he had normal depth and speed perception while driving an automobile. He passed all the plate identifications which comprise the Ishihara test.

Although I cannot explain this phenomenon with any certainty, it is my belief that what is taking place is a form of retinal rivalry wherein what is distorted with one eye is compensated by the other eye. This would explain why use of the red contact lens on the non-dominant eye appears to be more effective.

In fitting the lens, the procedures used are similar to those for fitting other contact lenses. The lens thickness and curvature may be altered to suit the patient who does have satisfactory visual acuity.

I claim:

1. A method for improving color discrimination in a person deficient in color discrimination comprising the method of applying to one eye only a thin corneal contact lens transmitting light substantially only in the red zone, having light transmission in excess of approximately 40%, and having substantially no light transmission below about 590 millimicrons; the other eye being left uncovered except for the optional use of a spectacle lens, conventional corneal contact lens, or a combination thereof to provide a desired refractive correction for that eye.

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3,586,423 6/1971 Zeltzer ..... 351—39

DAVID SCHONBERG, Primary Examiner
J. W. LEONARD, Assistant Examiner

U.S. Cl. X.R.
351—41, 44, 162

App. 21

United States Patent

[11] **3,586,423**

[72] Inventor **Harry I. Zeltzer**
9 Rumford, Lexington, Mass. 02173

[21] Appl No. **49,582**
[22] Filed **June 24, 1970**
[45] Patented **June 22, 1971**
Continuation-in-part of application Ser. No. 857,543, Sept. 12, 1969, now abandoned, which is a continuation-in-part of application Ser. No. 462,068, June 7, 1965, now abandoned.

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[54] **METHOD OF IMPROVING COLOR DISCRIMINATION**
3 Claims, No Drawings

[52] **U.S. Cl.** **351/39, 351/41, 351/44, 351/162**
[51] **Int. Cl.** **G02c 7/10, G02c 7/04, G02b 1/04**
[50] **Field of Search** **351/26, 35, 39, 41, 44, 162, 163**

[56] **References Cited**

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Primary Examiner—David Schonberg
Assistant Examiner—John W. Leonard
Attorney—Joseph Zallen

ABSTRACT: A method and device are described for improving color discrimination in persons having a substantial amount of deficiency in their ability to discriminate between red and green colors, commonly referred to as "color blindness." The invention comprises applying to one eye only a corneal contact lens transmitting light substantially only in the red zone and leaving the other eye either naked or with its customary refractive correction, if any.

METHOD OF IMPROVING COLOR DISCRIMINATION

This is a continuation-in-part of my prior copending Pat. application, Ser. No. 857,543, filed Sept. 12, 1969 now abandoned, which in turn was a continuation-in-part of my then copending Pat. application, Ser. No. 462,068, filed June 7, 1965 and now abandoned.

BACKGROUND OF INVENTION

This invention relates to a method for improving color discrimination. In particular, it relates to a method and device for improving color discrimination in persons who are red-green color deficient.

It is generally believed that a person with normal color vision is able to discern an uninterrupted series of hues from red of about 760 millimicrons to violet of about 380 millimicrons with no black, grey or white areas. Persons with normal color vision clearly differentiate between the seven ordinary hues of red, orange, yellow, green, blue, indigo and violet.

However, according to some authorities, approximately 8 percent of males have a vision defect known as color discrimination deficiency or color blindness, a lack of a part of the neural apparatus necessary for normal color vision. Such neural defects are not completely understood. It is generally agreed that the most common type of color blindness is the inability to distinguish between red and green, known as red-green color blindness. A person having such color blindness has great difficulty in distinguishing brown from green and sees various shades of red (such as pink) as grey. Such red-green color blindness has been a great handicap to the persons involved, particularly with respect to their occupations, wherein color is a growing form of object identification. Further, colorblind persons, of whom there are about 8 million in the United States, are a hazard to themselves and to others, particularly in automobile driving and in hunting.

This problem of color discrimination deficiency has been reported and studied for many years. However, no one, to my knowledge, has ever suggested or proposed any method or device that would enable a person who had red-green color discrimination deficiency to improve it to any practical or substantial extent. Thus, although proposals have been made in the past to improve the ability of such persons to distinguish between red and green colored signal lights, no method or device has heretofore been proposed to improve the ability of such persons to discriminate between such colors in their everyday normal existence.

One object of the present invention is to provide a method and device of improving color discrimination among persons having color discrimination deficiency to such an extend that use of the method or device can extend for a full day, including nighttime without inhibiting the mobility of the person and without interfering with his normal everyday tasks.

Further objects and advantages of this present invention will be apparent from the description and claims which follow.

SUMMARY OF INVENTION

The invention comprises the use on one eye only of a corneal contact lens transmitting light substantially only in the red zone, with the other eye remaining naked or having its customary refractive correction, if any. The lens should be as thin as possible to avoid substantial loss of visual acuity. Although this single red corneal contact lens can be used with either the dominant or nondominant eye, I have noted that placing the lens on the nondominant eye appears to be more comfortable for the user.

When such a lens is worn in this fashion, a patient who could not hitherto pass the Ishihara test wherein red and green spot figures are used, was now able with my invention to pass this test and distinguish among brown, green, red and pink objects, which he had hitherto been unable to do. The lens can be worn either day or night or both with no special requirements except those of cleanliness and removal when sleeping normally associated with contact lenses. The use of this lens does not interfere with the person's mobility or his performance of ordinary functions such as walking, driving, writing, reading or working, whether under normal light or artificial light. The use of my invention does not interfere with binocular vision.

The single red corneal contact lens of this invention can be made so as to incorporate a desired refractive correction, or it can be used with a spectacle lens having the correction for that same eye or the refractive correction can be divided between the contact lens and the spectacle lens. The other eye, *not* covered with a red contact lens, can have required refractive correction in the form of a conventional contact lens or spectacle lens or both.

For example, a color deficient person who is without refractive error but requires reading glasses (spectacle lenses), as in presbyopia could use reading glasses in conjunction with the single red corneal contact lens of this invention. For color deficient persons with binocular refractive errors, the other eye can have a conventional corrective corneal contact lens with or without spectacles.

I have found by experimentation that thickness is a factor which limits the utility of a colored contact lens made in accordance with this invention. Thus, if the eye requires correction, the resultant contact lens may be so thick as to be overly dark for effective use. Accordingly, in such a case, a single red contact lens having no correction would be used in conjunction with a spectacle lens having the desired refractive correction. In this manner, the red contact lens may be kept thin enough to permit sufficient visual acuity. In general, the acuity should be at least 20/40 so that stereopsis is not lost. I have further found that the amount of light absorption by the contact lens of this invention also has an effect on its utility. Thus, if the lens absorbs more than approximately 86 percent of the light, that is to say has light transmission of less than approximately 14 percent, binocular vision is affected. Further, if the amount of light absorption is less than approximately 60 percent, that is to say the transmission is higher than about 40 percent, color discrimination ability begins to decrease. These percentages might be better understood if one notes that a plain contact lens has about 10 percent loss or 90 percent transmission, while a lightly tinted lens has about 30 percent absorption or 70 percent transmission.

Although the corneal contact lens of this invention can be made from a variety of materials, I prefer to use clear transparent plastic, materials such as the polymethacrylate resin group. An example of such a resin which I have found useful is polymethylmethacrylate.

It is noted that the red contact lens of this invention is used monocularly. Thus, the "uncovered" eye receives a color-deficient image while the lens-covered eye receives an image which is differently shaded. The individual goes through a brief self-learning process in the true color. Thus, for example, the typical color discrimination deficient person cannot tell green from brown. From experiments with my patients, I have determined that with my invention the person sees green darker and brown lighter.

The "uncovered" eye is an important factor in this invention, since it receives certain colors correctly which are obscured in the eye covered with the single red contact lens. I have found that each eye compensates for the disability of the other by a process which is a form of "rectinal rival," a phenomenon of the visual mechanism.

Although the single red corneal contact lens of this invention can be used generally with persons deficient in color discrimination, there are certain contra-indicators. Thus, the lens of this invention should not be used where there is corneal pathology such as keratitis or where there are other diseases of the eye wherein the use of conventional corneal contact lenses are contra-indicated. Further, the single corneal contact lens of this invention would not be expected to improve color perception in persons who have amblyopia, strabismus or monocular vision.

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SPECIFIC EXAMPLE OF INVENTION

In one example of my invention, a contact lens was used which was made of red polymethacrylate. The lens had a radius of 8.23 mm., a diameter of 9.0 mm. and a thickness of 0.23 mm. It had a peripheral bevel of 11.00/0.3, a secondary curve of 9.00/0.7 and an optic zone of 8.00. The lens transmitted substantially only in the red zone with practically no transmission below about 590 millimicrons, a peak at about 624 millimicrons, a range of about 590 to 700 millimicrons and an absorption of about 86 percent.

I fitted a patient with this single red contact lens in only one eye, namely his nondominant eye, leaving the dominant eye with no lens or uncovered. The patient indicated that he could now clearly study and decode color bands on resistors at a normal reading distance with average illumination and distinguish among red, brown and green. Prior to this time, although he had good visual acuity, he had always been colorblind and in particular completely unable to distinguish between red and green with, for example, brown looking like green and the various shades of red, as for example pink, appearing grey

When the patient did not wear the lens, he reverted back to his original colorblind state but when he wore the lens, he always had this new ability to distinguish among red, brown and green. The lens did not in any way interfere with the patient's mobility and enabled him to continue to work at his job.

I wish to make it clear that while my experiments have shown that a single thin red colored corneal lens applied to one eye with the other eye uncovered will produce a practical, useful and substantial improvement in the ability of a colorblind person to improve his color discrimination, the use of two such lenses, one in each eye, does not produce this desired effect but instead distorts colors, such as orange.

I wish to also point out that a spectacle lens made of the same material as the corneal contact lens of this invention cannot be used as a substitute for the corneal contact lens. First, it would be exceedingly difficult to fabricate a spectacle lens of the same material and thickness because such a lens of, for example, 0.23 mm. thickness would be exceedingly fragile and difficult to form with accuracy. Even if such a spectacle lens were used in place of a corneal contact lens, it would provide significantly smaller improvement in color discrimination. When such a spectacle lens was made of the same material but of a minimum thickness to make it feasible, as for example, 0.5 mm., the images were blurred and the colors less distinguishable than without any lens. I have further found that when such spectacle lenses were used for both eyes, overall vision was seriously impaired and certain colors were distorted such as orange.

I claim:

1. A method for improving color discrimination in a person deficient in color discrimination comprising the step of applying to one eye only a thin corneal contact lens transmitting light substantially only in the red zone and having between approximately 14 and 40 percent light transmission and substantially no transmission below approximately 590 millimicrons, the other eye being left uncovered except for the optional use of a spectacle lens, conventional corneal contact lens, or a combination thereof to provide a desired refractive correction for that eye.

2. The method of claim 1 wherein a spectacle lens having a desired refractive correction is used in conjunction with said red contact lens.

3. The method of claim 1 wherein said red lens is made of a polymethacrylate resin and has a thickness of approximately 0.23 millimeters.

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May 15, 1962 C. W. NEEFE 803968 3,034,403

CONTACT LENS OF APPARENT VARIABLE LIGHT ABSORPTION

Filed April 3, 1959

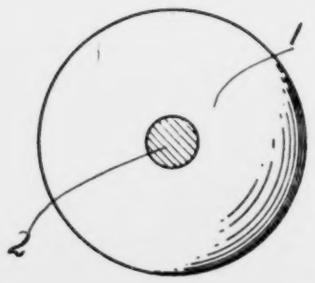

FIG. 1.

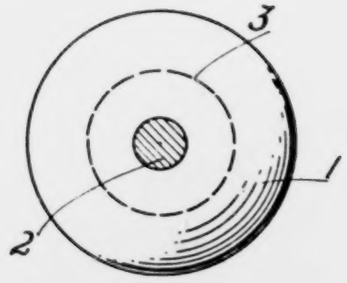

FIG. 2.

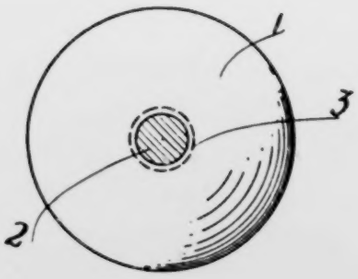

FIG. 3.

FIG. 4.

FIG. 5.

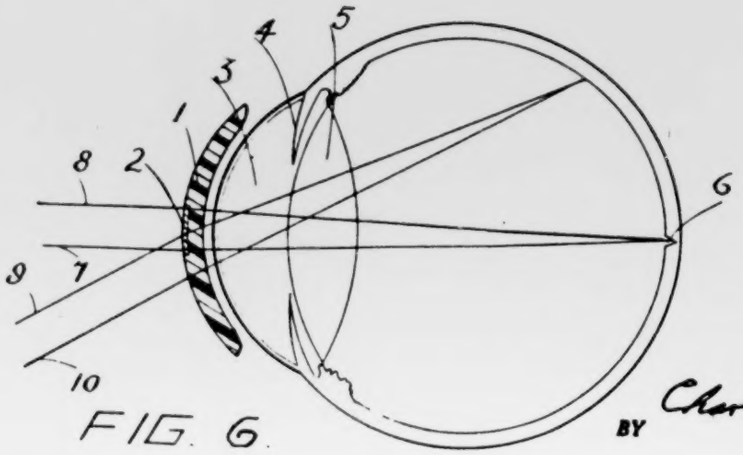

FIG. 6.

INVENTOR.
BY Charles W. Neefe

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United States Patent Office 3,034,403 Patented May 15, 1962

3,034,403

CONTACT LENS OF APPARENT VARIABLE LIGHT ABSORPTION

Charles W. Neefe, Big Spring, Tex., assignor to Neefe-Hamilton Research Company, Big Spring, Tex.

Filed Apr. 3, 1959, Ser. No. 803,968
1 Claim. (Cl. 88—54.5)

The herein disclosed invention relates to the field of ophthalmic optics and contact lenses in particular. The line of thought in this disclosure will pertain primarily to contact lenses, but applies equally to other fields, such as the implant lens used to replace the natural crystalline lens in some cataract operations.

Sunglasses, lenses which absorb part of the visible spectrum, are widely used as protection from the bright and harmful radiations from the sun. It is also understood that these dark tinted lenses are a disadvantage in dimly lighted areas and at night.

It is the object of this invention to produce a lens which for all practical purposes will be of dark tint when worn in the bright sunlight and of light overall effective tint when worn indoors under low level of illumination and at night. This apparent change in absorption will take place automatically and to the correct degree with no special or voluntary action on the part of the wearer. This lens is a sunglass lens when in bright sunlight and a lens of very light tint when in the dark. Other objects of the invention will become apparent as the specification proceeds. It is understood that this disclosure is merely illustrative and is in no way limiting and not confined to the exact features shown herein and changes in detail of construction are permissible without departing from the spirit of the invention and claims which follow.

The natural action of the iris controls the degree of tint or absorption of this lens. The central tinted area which is as large as the pupil when it is contracted to its smallest size in bright sunlight acts as the darkest sunglass tint. As the pupil enlarges due to less light entering the eye the outer clear parts of the lens are used, reducing the average or overall degree of tint. In a dark room such as a motion picture theater or at night time the pupil dilates to its largest natural size and the average or overall tint of the lens is very low due to the fact that if the pupil dilates to three and one half (3.5) times its smallest diameter, from two millimeters to seven millimeters, the area increases to twelve and one fourth (12.25) times and overall tint is reduced by a factor of 12.25 to one. It is understood that all persons may not have a normal iris reflex. This will not prevent these persons from receiving excellent results since a much smaller factor is acceptable. This new type lens is very effective in the bifocal contact lens of simultaneous foci, the distance segment being tinted and reading segment clear. In the bright sunlight the wearer has the effect of sunglasses, which for bifocals I recommend a medium or light tint, indoors under lower level of illumination the reading segment which is clear comes into greater use as the pupil dilates. This is as it should be since most close work is carried on indoors. Also as the pupil dilates the need for the reading segment increases. It is an established optical fact that the depth or range of usable, sharp focus of a lens system decreases as the aperture increases and therefore the depth or range of sharp focus increases as the aperture decreases until at a pin hole size the depth of sharp focus is very great.

It is also understood that light rays entering the eye of its optical axis will pass through the clear part of the lens, and this has the effect of reducing the absorption of the lens as the image moves away from the optical axis. At approximately 20 degrees to each side of the optical

axis the tint drops to approximately 50 degrees of the amount present on the optical axis. It will be noticed that the term approximate is used here. This is because the increase in brightness is dependent upon the size of the colored segment, pupil opening, the iris reflex, and the depth of the anterior chamber. This has no significant effect on the use of the lens as the lens moves with the eye and the area of maximum tint remains on the macula at all times. The added brightness in the periphery area has no significant effect pro or con since the change is of very gradual nature. This increased brightness may be of some help in the peripheral fields for the detection of motion since the visual acuity is very limited in the outer fields.

Referring now to the accompanying drawings:

FIGURE 1 shows the new lens from the front.

FIGURE 2 shows the new lens with the pupil dilated.

FIGURE 3 shows the new lens with the pupil contracted.

FIGURE 4 shows the tint on the surface.

FIGURE 5 shows the tint completely through the lens.

FIGURE 6 shows the new lens on the eye and the path of light rays through the lens and eye.

The construction of the variable tint lens is as follows:

FIGURE 1 shows the lens from a front view, area **1**, FIGURE 1 being the clear or lighter part, area **2** being the darker tinted part.

FIGURE 2 shows area **1**, the clear, and **2**, the darker in relation to the dilated pupil, at **3**, as it would be in the dark.

FIGURE 3 shows area **1**, the clear, area **2**, the darker, and **3**, the pupil contracted as in bright sunlight.

FIGURE 4 shows the lens in section with the absorption area **2** dyed into either front or rear surface or both, area **1** being the clear or lighter area.

FIGURE 5 shows the lens in section with the absorption area **2** occupying the entire thickness of the central area of the lens, **1** being the clear or lighter area. This type may be made by drilling a hole in a clear plastic blank and inserting a colored plug or rod into the hole and securing it with cement of methyl methacrylate monomer and polymerizing the monomer or by adding colored monomer and polymerizing it into the lens. The lens and plug may also be heated to the softening point and a straight cylinder or slightly tapered plug inserted and the plastic allowed to cool. The lens is then cut from this blank. This process may also be used for making the pupil or pin hole type contact lens by starting with a black or dark colored blank and inserting a small plug of clear plastic.

Either of the methods may also be used for implant lenses, to replace the natural crystalline lens inside the eye, FIGURE 6, area **5**, after surgery for cataracts.

FIGURE 6 shows the new variable density lens in place on the eye in section. Area **1** shows the clear or lighter segment, **2** shows the darker segment, **3** shows the pupil. **4** shows the iris, **5** shows the crystalline lens, **6** the macula, **7** and **8** two light rays passing through the darker section and focusing on the macula, **9** and **10** shows two light rays off the optical axis, **9** passing through the colored segment, and **10** passing through the clear segment.

I claim:

A protective contact lens for wear on the eye comprising a transparent concavo-convex lens fitted to the curvature of the eye and having a small, circular, tinted light absorbing area in the center of the lens, the diameter of said area being appreciably smaller than the diameter of the eye pupil when dilated in dim light and approximating the diameter of the eye pupil when contracted in bright light, whereby the tinted light absorbing

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area has a greater effectivity in overall light reduction in bright light and lesser effectivity in dim light.

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